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EXAMINER	
TAYONG, HELENE E	
ART UNIT	PAPER NUMBER
2609	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	04/03/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 04/03/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/777,178	FITTON ET AL.	
	Examiner	Art Unit	
	Helene Tayong	2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/13/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in United Kingdom on 2/27/03. It is noted, however, that applicant has not filed a certified copy of the Certified Foreign Priority Documents application as required by 35 U.S.C. 119(b). "Search and Examination Report" does not provide Country, Day, Month, Year of its filing and applicant information. Such document is not a certified foreign priority document.

Claim Objections

2. Claims16-22 are objected to because of the following informalities: In claim 16, line 1, Insert the word **means** between "determining comprises". Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims1-3,7-8,10-11,13,15-17and19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakazawa (US 5563909).

As shown in figure 2, Nakazawa discloses an antenna branch selector for selecting for processing at least one of a plurality of antenna branches (11a-11n) each

coupled to a respective receive antenna (13a-13n) and carrying a received signal, said antenna branch selector comprising:

(1) Regarding claim 1;

(a) a signal selector (20) having a plurality of inputs to receive signals from said plurality of antenna branches and having an output to output a selected signal for processing (fig. 2, 20, col. 3, lines 43-51);

(b) a time-to-frequency domain converter (18) configured to receive a time domain signal from each of said antenna branches and to provide a corresponding frequency domain output signal (fig. 2, 15a-15n, col. 4, lines 1-4); and

(c) a controller (19)coupled to said time-to-frequency domain converter and to said signal selector to control said signal selector to select a said antenna branch responsive to said frequency domain output signal (fig. 2, 19, col. 4, lines 5-11).

(2) Regarding claim 2;

wherein said controller is configured to select a said antenna branch responsive to a difference between a signal level at a first frequency and a signal level at a second frequency in a said frequency domain output signal for an antenna branch (fig.9, 50a, col. 7, lines 13-51).

(3) Regarding claim 3;

wherein said first and second frequencies comprise frequencies of said received signal (col. 4, lines 57-65).

(4) Regarding claim 7;

wherein said controller is configured to select a said antenna branch responsive

to a comparison of said difference in signal level for one said antenna branch with said difference in signal level for another said antenna branch (col. 4, lines 57-65).

(5) Regarding claim 8;

wherein said controller is further configured to determine an indication of received power for a said antenna branch, and wherein said controller is further configured to select a said antenna branch responsive to said received power indication (col. 7, lines 13-23).

(6) Regarding claim 10;

wherein said controller is responsive to a sum of signal levels at a plurality of said third frequencies (fig. 8,45, col.6, lines 9-11).

(7) Regarding claim 11;

wherein said received signal comprises a packet data signal including a payload signal portion, and wherein said controller is further configured to control said signal selector during said payload signal portion (fig. 6, col. 5, lines 21-28).

(8) Regarding claim 13;

A receiver including the antenna branch selector of claim 1 (col. 11, lines 7-12).

(9) Regarding claim 15;

(a) transforming a received signal from each said antenna from the time domain to the frequency domain (fig. 3, 34) and (col. 5, lines 8-13);

(b) determining a measure of multipath fading for the signal (interpreted as propagation characteristics) from each said antenna from said frequency domain transformed signal (col. 6, lines 7-25); and

(c) selecting a received signal responsive to a said determined measure of multipath fading (col. 6, lines 37-49).

(10) Regarding claim 16;

wherein said determining comprises comparing levels of said received signal at two or more frequencies (col. 7, lines 39-44).

(11) Regarding claim 17;

wherein said received signal comprises a packet data signal including a preamble portion and wherein said determining is performed during said preamble signal.

(12) Regarding claim 19;

determining a measure of received signal strength, for the signal from each said antenna from said frequency domain transformed signal, and wherein said selecting is further responsive to a said determined measure of received signal strength (fig. 8, 35, col. 5, lines 57-65).

(13) Regarding claim 20;

determining a measure of received signal to noise and/or interference ratio (interpreted as propagation characteristics), for the signal from each said antenna from said frequency domain transformed signal and wherein said selecting is further responsive to said determined measure of received signal to noise and/or interference ration (col. 5, lines 57-65) and (col. 8, lines 27-51).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa (US 5563909) in view of Laroia et al. (US 6920192)

(1) Regarding claim 4;

Nakazawa discloses all of subject matter as described above except for specifically teaching wherein a said received signal has, in the frequency domain, at least two tones, and wherein said first and second frequencies comprise frequencies of said tones (fig. 4, col. 5, lines 1-5 and col. 4, lines 64-67).

However, Laroia et al. in the same field of endeavor, teaches wherein a said received signal has, in the frequency domain, at least two tones, and wherein said first and second frequencies comprise frequencies of said tones .

In cellular wireless systems with adaptive antenna arrays, the multiple antenna of the array are typically deployed at the base station of each cell, and the signals transmitted or received by the antennas are linearly combined with certain complex weights. By properly adjusting the antenna weights, the multiple antennas can improve signal-to interference ratio (SIR) and receive diversity. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize frequencies of tones of Laroia et al's in the branch selector of Nakazawa to reduce interference in cellular wireless systems. The motivation to utilize Laroia et al's frequencies of tones in the branch selector of Nakazawa was to provide frequency diversity.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa and Laroia et al. as applied to claim 4 above and further in view of Wilkinson (4606047)

(1) Regarding claim 5;

Nakazawa discloses all of subject matter as described above except for specifically teaching wherein said received signal comprises a packet data signal including a preamble signal portion, and wherein said tones comprise tones of said preamble signal portion.

However, Wilkinson in the same field of endeavor, teaches wherein said received signal comprises a packet data signal including a preamble signal portion, and wherein said tones comprise tones of said preamble signal portion (fig. 3, col5, lines 12-26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to recognize that for transmitting and receiving radio frequencies signals, frequency selective fading and intersymbol interference can occur across the high frequency band because of ionoshheric induced variations in multipath propagation. To overcome the undesirable effects of multipath propagation, appropriate signal processing before and after transmission can be done by using packet data signals with preambles. The motivation to utilize Wilkinson's signals instead of Nakazawa's was to improve on received signal quality.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa , Laroia et al. and Wilkinson as applied to claim 5 above and further in view of Kishimoto (7035612)

(1) Regarding claim 6;

Nakazawa discloses all of subject matter as described above except for specifically teaching wherein said received signal comprises a Bluetooth compatible signal.

However, Kishimoto in the same field of endeavor, teaches wherein said received signal comprises a Bluetooth compatible signal (col. 8, lines 54-64).

7. It would have been obvious to one of ordinary skill in the art at the time the invention was made to recognize that the frequency diversity effect is difficult to achieve

in the low speed frequency hopping mode because a plurality of information symbols are transmitted on a single frequency. To overcome this problem, the antenna diversity mode is used with the frequency hopping mode at the same time (col. 3, lines 17-26). Bluetooth is used as an example of a digital wireless communications system using low speed frequency hopping mode (col. 3, lines 39-41). The motivation to utilize Kishimoto et al.'s bluetooth signals instead of Nakazawa's was to improve on transmission quality.

8. Claims 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa (US 5563909) in view of Kishimoto et al.(7035612 B2)

(1) Regarding claim 9;

Nakazawa discloses all of subject matter as described above except for specifically teaching wherein said controller is further configured to select a said antenna branch responsive to a difference between signal levels in said frequency domain signal for an antenna branch at a third frequency comprising a frequency of said received signal and at a fourth frequency comprising a frequency at which substantially no signal level from said received signal is expected.

However, Kishimoto et al. in the same field of endeavor, teaches wherein said controller is further configured to select a said antenna branch responsive to a difference between signal levels in said frequency domain signal for an antenna branch at a third frequency comprising a frequency of said received signal and at a fourth frequency comprising a frequency at which substantially no signal level from said received signal is expected (fig. 5 step 10-16 col. 9, lines 25-47 and col. 11, lines 53-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize frequency difference of Kishimoto et al's with the system Nakazawa's in order to improve communications performance by increasing the affinity between frequency hopping and antenna diversity communications. The motivation to utilize Kishimoto et al.'s frequency difference instead of Nakazawa's was to improve on transmission and reception quality.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa (US 5563909) in view of Boer et al. (US 6967994 B2)

(1) Regarding claim 12;

Nakazawa discloses all of subject matter as described above except for specifically teaching wherein said controlling of said signal selector during said payload signal portion is conditional upon a Doppler frequency shift of said received signal being greater than a threshold value.

However, Boer et al. in the same field of endeavor, teaches wherein said controlling of said signal selector during said payload signal portion is conditional upon a Doppler frequency shift of said received signal being greater than a threshold value. (col.3, lines 36-53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the method of Boer et al. with the method of Nakazawa in order to determine what the propagation conditions of channel will be. The motivation to combine these would be to improve detection quality.

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Nakazawa (US 5563909) in view of Kishimoto et al. (US 7035612 B2)

(1) Regarding claim 14;

Nakazawa discloses all of subject matter as described above except for specifically teaching a processor control code to, when running implement the antenna branch selector of claim 1.

However, Kishimoto et al. in the same field of endeavor, teaches a processor control code to, when running implement the antenna branch selector of claim 1.(col. 3, lines 20-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the processor control code of Kishimoto et al to the system of Nakazawa in order to correct error during transmission. The motivation to combine Kishimoto et al's code to Nakazawa's system would be to improve transmission quality.

11. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa (US 5563909) as applied to claim 17 in view of Wilkinson (US 4606047 B2)

(1) Regarding claim 18;

Nakazawa discloses all of subject matter as described above except for specifically teaching wherein said two frequencies comprise tones of said preamble signal.

However, Wilkinson in the same field of endeavor, teaches wherein said two frequencies comprise tones of said preamble signal (fig. 2, col.4, lines 52-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to recognize that for transmitting and receiving radio frequencies

signals, frequency selective fading and intersymbol interference can occur across the high frequency band because of ionoshheric induced variations in multipath propagation. To overcome the undesirable effects of multipath propagation, appropriate signal processing before and after transmission can be done by using packet data signals with preambles. The motivation to utilize Wilkinson's signals instead of Nakazawa's was to improve on received signal quality.

12. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa (US 5563909) in view of Kishimoto et al(7035612 B2)

(1) Regarding claim 21;

Nakazawa discloses all of subject matter as described above except for specifically teaching wherein said packet data signal includes a payload portion and further comprising monitoring a received signal indicator during reception of said payload portion and selecting a received signal responsive to said monitoring.

However, Kishimoto et al in the same field of endeavor, teaches wherein said packet data signal includes a payload portion and further comprising monitoring a received signal indicator during reception of said payload portion and selecting a received signal responsive to said monitoring (col. 2, lines 58-63)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to recognize that for transmitting and receiving radio frequencies signals, frequency selective fading and intersymbol interference can occur across the high frequency band because of ionoshheric induced variations in multipath propagation. To overcome the undesirable effects of multipath propagation, appropriate

signal processing before and after transmission can be done by using packet data signals with preambles. The motivation to utilize Kishimoto et al's packet data signal that includes a payload portion instead of Nakazawa's was to improve on received signal quality and check for transmission errors.

(2) Regarding claim 22;

Nakazawa discloses all of subject matter as described above except for specifically teaching wherein monitoring a received signal frequency change parameter, and wherein said selecting of a received signal responsive to said monitoring is responsive to said frequency change parameter.

However, Kishimoto et al in the same field of endeavor, teaches wherein said packet data signal includes a payload portion and further comprising monitoring a received signal indicator during reception of said payload portion and selecting a received signal responsive to said monitoring (col. 2, lines 58-63)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to recognize that for transmitting and receiving radio frequencies signals, frequency selective fading and intersymbol interference can occur across the high frequency band because of ionoshheric induced variations in multipath propagation. To overcome the undesirable effects of multipath propagation, appropriate signal processing before and after transmission can be done by using packet data signals with preambles. The motivation to utilize Kishimoto et al's received signal frequency change parameter instead of Nakazawa's was to improve on received signal quality and check for transmission errors.

13. Claims 23 ,24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa (US 5563909) in view of Boer et al. (US 6967994 B2)

(1) Regarding claim 23;

Nakazawa discloses all of subject matter as described above except for specifically teaching

(a) means for a received signal parameter measured during said preamble signal;

(b) means for determining a Doppler frequency change of said received signal; and

(c) means for reselecting said received signal during said payload signal conditional upon said determined frequency change being greater than a threshold frequency change.

(i) Regarding item (a)

Boer et al. in the same field of endeavor, teaches means for a received signal parameter measured during said preamble signal (col.2, lines 44-48)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Boer et al.'s received signal parameter measured during said preamble signal to the system of Nakazawa in order to provide the receiver with quality measure signal. The motivation to utilize Boer et al's received signal parameter measured during said preamble signal instead of those of Nakajima et al was to provide quality detection at the receiver end and hence increase throughput of data transmission.

(ii) Regarding item (b)

Boer et al. in the same field of endeavor, teaches means for determining a Doppler frequency change of said received signal (col.2, lines 48-54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Boer et al.'s received signal parameter measured during said preamble signal to the system of Nakazawa in order to provide the receiver with quality measure signal. The motivation to utilize Boer et al's Doppler frequency change of said received signal instead of those of Nakajima et al was to provide quality detection at the receiver end and hence increase throughput of data transmission.

(iii) Regarding item (c)

Boer et al. in the same field of endeavor, teaches means for reselecting said received signal during said payload signal conditional upon said determined frequency change being greater than a threshold frequency change (col.3, lines 36-53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the method of Boer et al. with the system of Nakazawa in order to determine what the propagation conditions of channel will be. The motivation to combine these would be to improve detection quality.

(2) Regarding claim 24;

Nakazawa discloses all of subject matter as described above except for specifically teaching

(a) a received signal parameter measured during said preamble signal;

(b) determining a Doppler frequency change of said received signal; and

(c) means for reselecting said received signal during said payload signal conditional upon said determined frequency change being greater than a threshold frequency change.

(i) Regarding item (a)

Boer et al. in the same field of endeavor, teaches a received signal parameter measured during said preamble signal (col.2, lines 44-48)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Boer et al.'s received signal parameter measured during said preamble signal to the system of Nakazawa in order to provide the receiver with quality measure signal. The motivation to utilize Boer et al's received signal parameter measured during said preamble signal instead of those of Nakajima et al was to provide quality detection at the receiver end and hence increase throughput of data transmission.

(ii) Regarding item (b)

Boer et al. in the same field of endeavor, teaches determining a Doppler frequency change of said received signal (col.2, lines 48-54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Boer et al.'s determining a Doppler frequency change of said received signal to the system of Nakazawa in order to provide the receiver with quality measure signal. The motivation to utilize Boer et al's determining a Doppler

frequency change of said received signal instead of those of Nakajima et al was to provide quality detection at the receiver end and hence increase throughput of data transmission.

(iii) Regarding item (c)

Boer et al. in the same field of endeavor, teaches means for reselecting said received signal during said payload signal conditional upon said determined frequency change being greater than a threshold frequency change (col.3, lines 36-53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the method of Boer et al. with the system of Nakazawa in order to determine what the propagation conditions of channel will be. The motivation to combine these would be to improve detection quality.

(3) Regarding claim 25;

Nakazawa discloses all of subject matter as described above except for specifically teaching wherein said threshold frequency change is dependent upon the duration of a said packet.

However, Kishimoto et al. in the same field of endeavor, teaches wherein said threshold frequency change is dependent upon the duration of a said packet (col. 3, lines 38-48)

Antenna diversity, is a mode in which signal fading at an antenna is reduced by using a plurality of antennas with low fading correlations. The signals from the antennas are switched to the receiver depending on the levels of signals at the antennas. To reduce the effects of fading and other propagation characteristics, it would have been

obvious to one of ordinary skill in the art at the time the invention was made to utilize method of Kishimoto et al. in the system of Nakazawa. The motivation to combine this method would be to improve on transmission and detection quality.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pallonen (US 6408169) discloses a method and system for selecting an antenna beam of base station of a radio system.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helene Tayong whose telephone number is 571-270-1675. The examiner can normally be reached on Monday-Friday 7:30 am to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lui Shuwang can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Helene Tayong

3/27/07

Shuwang Liu

SHUWANG LIU
SUPERVISORY PATENT EXAMINER